made in the quartz glass substrate **3** to have an arbitrary depth, the surface of the quartz glass substrate **2**, and the bottom surface of the quartz glass substrate **3**, arranged in parallel with each other. The piercing hole is used as a fluid passage for analyzing an instrument (to be called simply as fluid passage hereinafter).

[**0053**] It should be noted that in this embodiment, a groove is made in the quartz glass substrates; however it is possible that the groove is made in the quartz glass substrate **2** side, or the groove is made in both the quartz glass substrates.

[**0054**] Next, the step of forming such a micro-fluid passage will now be described with reference to **FIGS. 2A** to **2**H and **FIGS. 3A** to **3**F.

[**0055**] First, as can be seen in **FIG. 2A, a** non-doped polysilicon thin film **4** is formed on the entire surface of the quartz glass substrate **2** by LPCVD. In this embodiment, the quartz glass substrate **2** should be formed by polishing a substrate from both surfaces to have a thickness of 1 mm or less, and the thickness of the polysilicon thin film **4** should be 1 μm or less.

[**0056**] Next, as can be seen in **FIG. 2B, a** borosilicate glass thin film **5** is formed on one surface of the polysilicon thin film **4** by sputtering. It is preferable that the thickness of the borosilicate glass thin film **5** should be 1 μm or less.

[**0057**] As can be seen in **FIG. 2C, a** positive-type photoresist is spin-coated on the surface of the borosilicate glass thin film **5** so as to form a resist film **8**.

[**0058**] As can be seen in **FIG. 2**D, the resist film **8** is patterned by photolithographic technique so as to form a resist mask **8***a*. Further, as shown in **FIG. 2**E, the portion of the borosilicate glass thin film **5** which is exposed in the region other than that covered by the resist mask **8***a* is removed by anisotropic etching such as reactive ion etching (RIE), and then the underlying polysilicon thin film **4** is removed. After that, as shown in **FIG. 2**F, the resist mask **8***a* is removed by plasma asher, and thus a passage structuring substrate **10** having a groove **9** is formed.

[**0059**] Next, as can be seen in **FIG. 2G, a** non-doped polysilicon thin film **6** is formed on the entire surface of another quartz glass substrate **3** by LPCVD. It is preferable that the thickness of the borosilicate glass thin film should be 1 μm or less.

[**0060**] As can be seen in **FIG. 2H, a** positive-type photoresist is spin-coated on the surface of the polysilicon thin film **6** so as to form a resist thin film **11**. After that, as can be seen in **FIG. 3**A, the resist then film **11** is patterned by photolithographic technique so as to form a resist mask **11***a*.

[**0061**] Further, as shown in **FIG. 3**B, the portion of the polysilicon thin film **6** which is exposed is removed by RIE, using the resist mask **11***a* as a mask, and then, as shown in **FIG. 3**C, the resist mask **11***a* is removed by plasma asher.

[**0062**] Next, as shown in **FIG. 3D, a** quartz glass substrate **3** is immersed in a solution in which hydrofluoric acid and ammonium fluoride are mixed together, and thus the exposed portion of the quartz glass substrate **3** is removed by wet-etching, while using the patterned polysilicon thin film **6** as a mask. In this manner, a fluid passage structure substrate **13** having a groove **12** is formed. It is preferable that the depth or width of the groove **12** should be 100 μm or less.

[**0063**] Further, as shown in **FIG. 3**E, the fluid passage structuring substrate **10** and the fluid passage structuring substrate **13** are placed one on another such that the groove **9** and the groove **12** coincides with each other, and they are joined together by an anodic joining method, thus forming an element substrate **14**.

[**0064**] The anodic joining is carried out by heating the whole substrate while applying a voltage between the polysilicon thin film **4** and the polysilicon thin film **6**. It is preferable that the heating temperature for this should be about 350 to 500° C., and the applied voltage should be 200 to 1000V.

[**0065**] Next, as shown in **FIG. 3**F, the polysilicon thin film on the surface of the element substrate **14** shown in **FIG. 3**E, obtained by the joining is removed by RIE or wet-etching, thus forming a micro-fluid passage element **1**.

[**0066**] In this embodiment, a silicon layer consisting of a polysilicon thin film is used; however it may be consisting of an amorphous silicon thin film. Further, the silicon thin film should preferably be a non-doped silicon thin film. The silicon thin film can be made not only by LPCVD, but also by applying a semiconductor film forming technique such as plasma CVD, sputtering, ECR or evaporation.

[**0067**] In the meantime, the piercing hole **7** is formed to have a linear shape; however the shape is not limited to this, but it may be of a curved or wavy shape. Further, it is preferable that the depth or width of the piercing hole **7** should be 150 μm or less. In order to make a groove, wet- or dry-etching which is employed in the semiconductor technique, or a mechanical process, or the like can be used.

[**0068**] In this embodiment, a borosilicate glass thin film is used as an alkali-ion containing glass layer; however it may be a soda glass thin film or the like.

[**0069**] In the micro-fluid passage element **1** having the above-described structure, a piercing hole (fluid passage) is formed in a quartz glass substrate having an excellent transmitting property for light of a wavelength band from ultraviolet to visible. Therefore, it is becomes possible to carry out an optical detection in an ultraviolet to visible wavelength band.

[**0070**] The micro-fluid passage **1** is made mainly of glass, and the silicon thin film is a non-doped type, which has a thickness of 1 μm or less. Therefore, even if a high voltage is applied to the passage **1** as it is employed for capillary electrophoresis, the leakage of current which causes an influence to the electrophoresis, does not occur.

[**0071**] Further, the semiconductor process technique is employed in this embodiment, a very fine piecing hole passage can be easily made, and therefore the size of the micro fluid passage element can be reduced.

[**0072**] Next, a micro fluid passage element according to the second embodiment, will now be described in detail with reference to **FIG. 4**, which illustrates a schematic view of the structure of the element. In this figure, the structural members similar to those shown in **FIG. 1** are designated by the same reference numerals.